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ABSTRACT

A library has the capacity to deliver much more than just its locally stored and owned resources. By using telecommunications, information can be sought from online databases and from other pupils in schools across the world. This paper includes: (1) an explanation of the link between "virtual reality" and the "virtual library," and the projected impact on traditional school libraries of the concept of the virtual collection; (2) a description of Campus 2000 in Britain and NEXUS in Australia, two online information services geared to the needs of schools; (3) an explanation of the use of commercial online databases in schools; (4) an explanation of the use of telecommunications by pupils to gather information from other pupils; (5) a case study of the use of electronic mail in Northern Ireland to help Protestant and Roman Catholic schools break down barriers; and (6) comments on the virtual school library and the role of the librarian. (Contains 21 references.) (KRN)

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THE CONCEPT OF THE VIRTUAL SCHOOL LIBRARY

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Abstract
A library has the capacity to deliver much more than just its locally stored and owned resources. By using telecommunications, information can be sought from online databases and from other pupils in schools across the world. Examples will be drawn from the British and the Australian experience.

VIRTUAL REALITY AND THE VIRTUAL LIBRARY

Earlier this year, I started to think about the concept of the virtual library. What does it mean? The term "virtual reality" is very much in the news. Exciting computer games, with the participant's hand encased in a sensitive glove and headgear which allows his eyes to focus on tiny TV screens, make possible total immersion in a computer-generated world. There are more serious applications, in the training of brain surgeons or pilots, in the exploration of a nuclear reactor core or the surface of Mars. Such scenarios have appeared on popular television programmes, such as *Beyond 2000* in Australia and *Tomorrow's World* in the U.K. What is the link between this and the virtual library?

"The virtual library is one where the user has the illusion of access to a much larger collection of information than is really present, immediately or simultaneously. In the ultimate virtual library, he has access to universal knowledge, without delay at his desk." (Harley, 1980). The date of this quotation comes as a surprise. The words are those of A.J. Harley of the British Library's Lending Division, an organisation whose *raison d'etre* is to deliver a quick and cost-effective interlibrary loan service. This is the earliest incidence of the term "virtual library" on the LISA (Library and Information Science Abstracts) CD-ROM. More recently, it has been used by Lonsdale and Wheatley in their revealing survey of audiovisual and computer software materials in children's libraries in Britain: "In the emerging concept of the virtual collection (an expression of the library's capacity to deliver more than just its locally stored and owned resources), there is another opportunity to establish the library as a service relevant to young adults' needs." The authors concluded that most public libraries were not seizing this opportunity, and that this lack of response was effectively postponing the information age for many children, (Lonsdale and Wheatley, 1991).

Some school libraries, on the other hand, are at the leading edge of applying new technologies to the learning situation. It is the intention of this paper to describe some notable examples of the virtual school library at work. Firstly, though, it may be helpful to take a retrospective glance at the traditional school library, so that the new model can stand out in sharper relief. An early

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rationale was for the school library to support the curriculum, enriching the experience gained in the classroom by allowing the more talented pupils to delve deeper into a subject which interested them. In Loertscher's taxonomy for the develoment of the school library media centre, this would equate with the self-help warehouse stage, (Loertscher, 1988). At the other end of the scale was what he termed "Curriculum Development: along with other educators, the library media specialist contributes to the planning and structure of what will actually be taught." In the preceding stages are elements of CPPT (Co-operative Program Planning and Teaching), popularised by the Haycocks in Canada, in the journal *Emergency Librarian* and on their lecture tour of Australia. However, this model still largely depended on the librarian's ability either to predict what resources would be needed to support a particular unit of study, or to influence what units would be taught, after giving advice to teaching colleagues on materials that were immediately available or able to be purchased rapidly.

It is possible to argue that none of these models or rationales are totally appropriate to the 1990's. Advanced communications technologies make possible a library without walls, where the librarian's professional skills are deployed to provide an *information service* . The school library is the first link into a whole network of libraries and other information agencies. The best (and the most cost-effective) information source may not be the two-year old reference book, which cannot be replaced through lack of funds, but a one-minute search of an online database. Once this is recognised, an entire set of rules about collection management comes tumbling down. "The twenty-first century collection will... be an accumulation of information-bearing objects - printed, aural, graphic, digital - housed within the physical library, and also indices, abstracts and catalogs through which, using electronic channels, the library user has access to pre-identified resources held by other libraries and information providers. The twenty-first century "collection" thus combines the actual and the "virtual" collection. The "virtual collection" is an electronically browsable collection." (Ghikas, 1989). Mary Ghikas was writing here about public libraries. School librarians owe it to their teaching colleagues and to their pupils to demonstrate the realities of information as a commodity in the modern world. From a pedagogical as well as an economic standpoint, learning can be better facilitated by embracing these new principles.

Another management issue in putting the new concept into practice is how much staff time must be re-deployed towards learning about, and teaching others about, access to outside information, to other libraries and to online databases. Little data is available to us at present, but a recent survey in the U.S.A. is interesting. The members of the Standards Writing Committee of *Information Power*, were asked to draw up fourteen categories of work activity in a school library media centre, and also to estimate how much time was spent by personnel on each category. Under the heading "providing access outside the library media centre", the estimate by the panel of experts was 10% of time, but the reality was only 3.11%, (Everhart, 1992). The overseas perception is that online searching and allied activities have taken a greater hold in schools in America than in Britain and Australia, for example. It is likely, therefore, that the percentage in these countries would be even lower.

CAMPUS 2000

There are two online information services, specifically geared to the needs of schools, namely Campus 2000 in Britain and NEXUS in Australia, which have opened a new world of information access and brought real meaning to the old cliche "information at your fingertips". Formerly known as TTNS (The Times Network for Schools), Campus 2000 offers a variety of "own-brand databases", such as FELINE for Modern Language teaching, and also provides gateways into other databases, such as NERIS (National Educational Resources Information Service), which is

concerned with curriculum resources, and PROFILE, the huge news database, owned by the Financial Times. Every LEA (Local Education Authority) has its own IT advisor, who acts as the systems manager for Campus 2000 in that particular area, and is on call to give advice and training in its use. New subscribers are given an incentive to log on each day, when the systems administrator sends them messages and in some areas organises an e-mail competition or treasure hunt. In Cambridgeshire, a mailbox number was set up for the archaeological excavation at Flag Fen, near Peterborough, so that local schools could contact the archaeologists to obtain up-to-date progress reports and plan possible visits to the site.

Campus 2000 touches on all areas of the curriculum. A National Environment Database is being built up, whereby pupils can carry out a survey of water life in all the local pools, rivers and streams and send in the findings to the central data-gathering body. This is reminiscent of the way in which data was collected for the Domesday Interactive Video Project some years ago, (Blizzard, 1989). Information providers have a vested interest in becoming information users. Sixth form modern language students (the equivalent of Years 11 and 12) find the news digest service from French and German newspapers particularly useful, now that their final A Level examination is no longer based on literature, but includes an option on the events of the previous year in that particular country. Social Science and English students do not, unfortunately, have access to a similar service based on English newspapers. They can access PROFILE, but even with the special Campus price reduction of 60p per minute connect time, as opposed to the usual commercial £1.00 per minute, this is still an expensive proposition. PROFILE gives access to the full text of a wide range of newspapers and magazines, and is the database used by professional journalists. Pupils could, for example, study news reporting of the Iraqi invasion of Kuwait, and compare the treatment of the news stories in different newspapers. Several other examples of the ways in which schools use Campus 2000 are described by Wheeler, (Wheeler, 1991).

NEXUS

NEXUS began as an electronic bulletin board for schools in South Australia, operating from the Education Department's Angle Park Computing Centre. From the beginning, NEXUS was a service designed for students and teachers, which is what distinguishes it from many systems which were created by taking existing public services and adapting front ends to cater for school users. "It acted as a catalyst in prompting many schools to purchase a modem and so begin gaining familiarity with telecommunications," (Leonard, 1990). The management processes are very simple, with one teacher in a school acting as the Accounts Manager and able to assign user ID's to pupils. Parameters can be set, for example a pupil can only log on on Thursday afternoon, or can only search a designated database or alternatively can have unlimited access until a $10 credit limit has been reached. Perhaps the greatest bonus is that the system is extremely simple to use, fom the logging on procedure to the screen design, which is uniform across all databases, bulletin boards and e-mail messages. All the barriers traditionally associated with searching commercial online databases have been removed. NEXUS is clearly for the end-user, not for the information professional.

NEXUS is now available across Australia, and its range of databases has been extended, (Leonard, 1991). One popular file is AAP (Australian Associated Press), a professional news wire service used by journalists in the print and broadcast media. It is constantly updated and the "raw news" stories are kept on NEXUS for several months. Pupils can read these and go on to examine the way in which different newspapers handle the stories. Like the other NEXUS databases, it can be searched by keywords, using Boolean operators, thus introducing students to

the real world of electronic information retrieval at an affordable price. Another useful database is the file provided by the Australian Bureau of Statistics, taken from the 1986 census. There are 47 tables, giving data on topics such as birthplace of immigrants, home ownership, marital status, etc, and these can be viewed by a particular local area, either by postcode or the SLA (Statistical Local Area). It is possible, for example, to discover which areas of Perth has more males than females, or which area has the most Italian migrants. Any of the data can be downloaded into a spreadsheet, allowing for closer examination, analysis and graphing. NEXUS also offers the SAGE (Science and Geography Education) database, an index to journals likely to be used by secondary school and TAFE (Technical and Further Education) students in the fields of geography and science. These include both Australian and international journals. Another bibliographic database is the index to the Computers and High Technology Supplement, which appears on Tuesdays in *The Australian* newspaper, and also the full text database of the Macquarie Dictionary. Some of these databases, such as AAP and SAGE, are chargeable. Others, including the Census and the Macquarie, are free. They illustrate the wide range of information available to school libraries in Australia, whereby the in-house resources can be greatly extended at very low cost. A more detailed study of services used by Australian schools has been made recently by Clyde, (Clyde, 1992), and an article documenting the history of ASCIS (Australian Schools Cataloguing Information Service) is currently going to press (Butterworth, 1992a).

WIDER HORIZONS: THE ONLINE INFORMATION SERVICES IN SCHOOLS PROJECT

Schools need to decide whether to stop at these school-oriented services or to extend their activities to the searching of large commercial online databases. This was the rationale behind a major British research project, which ran for two years from 1987 to 1989 under the direction of Ann Irving. Based in six schools, ranging from a Primary School to a Sixth Form College, the project investigated whether online searching was both feasible in the normal classroom situation, and also whether it was educationally worthwhile, (Irving, 1990). The online hosts included DIALOG, PROFILE, BLAISE, DATA-STAR and OCLC. The potential value of these services were linked to the nature of the modern school curriculum in terms of:

- the development of information handling skills;
- the use of a wide range of information sources;
- the need for very topical information;
- an understanding of how new information technologies are being applied.

School library collections lack the scope and currency to meet some of the new curricular needs, especially when pupils may themselves select a particular research topic as part of their GCSE cousework (the examination taken at 16+) or as part of their A Level studies (the examination taken at 18+). These choices are impossible to predict, and range from such diverse topics as the acoustics of wine glasses (quoted by Irving) and the influence of Lorenzo de Medici in Florence (the subject being researched by the author's own daughter at the present moment). Such individual research, where the pupils themselves choose the topic, is designed to increase motivation. With access to online systems, the librarian is in a position to make an immediate tactical response to any sudden information need; older pupils can themselves learn to do a literature search, perhaps modifying their topic as they go along. A further rationale made by Irving involved the concept of an "electronic field trip". This was, and indeed still is, a period when school-industry links are being encouraged and seen as beneficial to both sides. A "field trip" through the files of commercial database suppliers is the equivalent of a physical visit to an assembly line or shop floor, and just as important a preparation for the real world of the 21st century.

The implications for school librarians is that they will find themselves more in the role of "matchmaker" - matching students with the most suitable file for their needs - rather than acting as a direct intermediary between student and information. This was the conclusion reached by Carolyn Carter, the Project Officer for the Wider Horizons Project. She quotes the British Cabinet Office IT Advisory Panel:

> "The education system will, we believe, have a profound part to play in equipping the UK population with the skills - and perhaps more importantly the attitudes - necessary to bring success in the information business. Schools will need to provide tuition in the use of computer-based information systems... Above all, they should inculcate the concept that information has value."
> (Carter, 1989).

ST HILDA'S SCHOOL: AN AUSTRALIAN CASE STUDY

The expertise of the school librarian as a gatekeeper into the wider information world should be put at the disposal of teaching colleagues as well as pupils. The professional development needs of staff is an important aspect of the total information service provided. Discussing the total model for quality teaching, and the place technology and telecommunications have to play in this, Roy Lundin writes: " The reflective professional is or should be on a continual growth path, and is, therefore, continually analysing and improving practice. The extension of this process is *innovation.*" (Lundin, 1992). Curriculum development has to happen much more quickly these days, so that the education system can keep up to date with technological and social change. Using databases such as ERIC, teachers can check on how colleagues across the world are implementing new programmes. Sandra Naude, Senior Librarian at St Hilda's Anglican School for Girls in Perth, has been putting these ideas into practice for several years. A former Health Services Librarian with wide experience of online searching, she was encouraged by her Principal to provide such a service for colleagues, (Naude, 1990). Online services in use at St Hilda's School include ORBIT, AUSTRALIS, ASCIS, DISCOVERY and more recently BRS. This list of topics indicates the range of literature searches performed:

STAFF APPRAISAL	METACOGNITION
TEACHER EVALUATION	LOBBYING
TEST DESIGN	GRANTS
HYPERCARD	DESERTIFICATION
WALBERG, HERBERT J	SOUTH EAST ASIA
GIRLS AND SCIENCE	AUSTRALIAN CHILDREN'S AUTHORS
ADLER, MORTIMER J	GREENHOUSE EFFECT
PLAYGROUNDS	LANGUAGE RESEARCH
SCHOOL SCHEDULES	PASTORAL CARE

A typical example of the service was included in a video made by Edith Cowan University's Media Services Department. The segment shows the Head of Mathematics at St Hilda's investigating research into the particular problems of teaching number patterns and calculus to girls, (Butterworth, 1992b).

DOCUMENT DELIVERY

Searching large bibliographic databases, either online or on CD-ROM, presents the user with a list of references to journal articles, which may or may not be easily supplied. This is a problem which is currently straining the resources of many tertiary libraries, as more and

more of their users discover the potential of CD-ROM in aiding their research. Most school libraries have no experience of using the ILL (Inter Library Loan) system, and would need to make a major re-adjustment to their budget in order to do so. The Wider Horizons Project, described above, negotiated with the British Library Document Supply Centre at Boston Spa, so that each school was given a supply of free forms, which normally cost £3.00 each. They were thus able to by-pass the normal, rather slow, ILL route through the public library system. The rapid response time from the BLDSC, of four days in some cases, was an excellent demonstration of the efficiency of this organisation. Some schools used the project as a catalyst to forge closer links with tertiary institutions and other large libraries in their area, so that more resources were accessible to them. This experiment provides a lesson to all schools wishing to move nearer to the ideal of the virtual library: that it is necessary to tackle the problem of document supply, that the turn-around time is critical, and that some form of networking in the local area is a self-help solution which must be investigated.

PUPILS AS INFORMATION PROVIDERS

Some of the most innovative and exciting work using communications technology to facilitate learning has been done when pupils themselves *gather and analyse data*, thus contributing to the sum total of information stored in the central database. These young information providers quickly turn into confident information users. A major British project covering 65 schools, including some in Northern Ireland, Germany, America and Australia, used e-mail to demonstrate a creative, collaborative learning model (Keep, 1991). Under the aegis of NCET (National Council for Educational Technology), the project had eleven regional and two national co-ordinators. Isolated pockets of activity were thus drawn together, given focus and recorded in a systematic way, warts and all, for other teachers to learn from, emulate or reject, but on the basis of something more than the purely anecdotal evidence that had gone before. Ros Keep writes: "There are three major contributions electronic communication can make in the development of information skills in students: it is a useful resource for gathering information, it provides a context for purposeful research activity and it provides an audience for children's findings." Those who have previously regarded e-mail in schools as a means of exchanging only personal information, the kind that pen-pals might write to one another, may be surprised at this very sophisticated and structured form of information gathering. In the River Pollution Project, for example, pupils had to construct a database in which to store all the data as it came in from other schools. The cleanliness of the water was determined by the different creatures found there, over a period of time and at many points within the river system.

One particularly successful tool was that of the electronic questionnaire. Researchers in the corporate world have also discovered that people respond more honestly to questionnaires in the electronic format, and are more willing to admit to anti-social behaviour or petty crimes, for example, because of the perceived anonymity of the computer, (Sproull and Kiesler, 1991). In the NCET Dental Health Project, pupils devised their own questionnaire, from which it was discovered that more than 6% of children cleaned their teeth less than once a day, much to the righteous indignation of the young investigators. International communication opened up exciting possibilities. A German student in the final year of school requested information from a Northern Ireland Primary School about the conflict going on in the province. Questions such as: "Do you see any peaceful solutions?" and "Have you personally been involved in the conflict?" resulted in teachers and pupils having to sit down and think carefully about their situation, perhaps for the first time. English children in contact with an Australian school gained insight into really hot weather, when they found out that the Australians could not go to school on one occasion, because the tar had melted on the roads. Younger children discussed what was meant by "down under" and why Australians do not drop off the planet if they are underneath it! Some

of the children were only five years old. The amount of "off-line" activity which the projects generated was impressive. In the electronic writer-in-residence project, participants were sent off to travel the world on behalf of an old and infirm archaeologist. In order to respond, they had to research thoroughly the various locations, testing the resources of their library to the limit. This idea of not confining a writer-in-residence to one institution, but widening the sphere of activity through e-mail, has also been tried most successfully in Australia. Roald Dahl's vist in 1988, and the activity before and after, in formulating questions to the great man and in disseminating the answers, is shown in the NSW video, *Communicating Kids*.

EDUCATION FOR MUTUAL UNDERSTANDING: A NORTHERN IRELAND CASE STUDY

In the Province of Northern Ireland, electronic mail is being used to help Protestant and Roman Catholic schools break down barriers which exist between them. This is a region where almost all children attend denominational schools, where the teachers have attended separate training colleges and where religious differences are hardened by the violence going on around them. E-mail is seen as a new medium to foster mutual understanding, in a scenario where bombs and killings make physical interaction between schools impossible, (Cunningham, 1992). Seventeen schools took part in a project entitled *Food and Farming in Northern Ireland* in the first year, and then subsequently were free to choose their own topic. The Fermanagh group of schools chose *The Irish Famine, 1845-50* in the following year, a potentially explosive subject, since the suffering still lives in the collective Roman Catholic memory and the resentment against British rule feeds on it to this day. Clearly, traditional attitudes need to be confronted and talked out before a solution is possible. Photocopies of the admission register of a local Workhouse, to which the starving flocked during the famine, was obtained from the Public Record Office in Belfast, and each school was given the task of analysing it. The generalisations found in history books were discovered to be not entirely correct. For example, the workhouse was not filled with Roman Catholics; contrary to poular opinion, Protestants were also suffering. Daily admission figures were circulated on the e-mail system, and these progressed from twenty or thirty to a peak of 600 individuals clamouring for admission. History was brought to life for all the pupils involved. In another exercise, an emigrant questionnaire was compiled and sent to 150 schools in major British cities, such as Liverpool, Glasgow and London, seeking replies from descendants of Irish emigrants. Abbeydale School in Sheffield sent printed copies of the 1861 Census, showing that the majority of those giving their birthplace as Ireland came from the most stricken areas of western Ireland. An interesting analogy emerged. The present day population of Abbeydale is largely of immigrant Pakistani descent, so the children in Ireland were able to learn at first hand from children of their own age what it means to come from a remote rural background to an urban industrial environment, just as their own ancestors had done.

THE VIRTUAL SCHOOL LIBRARY AND THE ROLE OF THE LIBRARIAN

It is difficult to think of a more valid and meaningful learning experience using telecommunications than this E.M.U. project in Northern Ireland. It is an inspiration for librarians everywhere to set up a situation where teachers and pupils in their school can experience this kind of work. The use of new technologies can be motivational to both teachers and pupils, and can greatly enhance the teaching of library and information skills. Traditional relationships between pupils and teachers are being eroded by technology. Pupils can not only become autonomous learners, but they can become experts on a topic, either individually or collaboratively. At the same time, teachers need to become students, in order to keep up to date with the new technological developments. The school librarian's role is to provide the supportive environment which allows both of these things to happen. As Beverley Anderson commented recently: "We could just as easily produce a generation of highly sophisticated

browsers, electronic couch potatoes whipping at high speed through information and ideas assembled by other people." (Anderson, 1992). The important thing is to produce active, creative learners in a library that is a learning workshop, where both the physical and the virtual collection is appropriate to the 1990's. This paper, in documenting examples of good practice, has attempted to provide inspiration and practical advice on how to proceed.

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